

1973 REPORT

LEGISLATIVE RESEARCH COMMISSION

SEPTIC TANK WASTES

TO THE MEMBERS OF THE GENERAL ASSEMBLY

The Legislative Research Commission herewith reports to the 1973 General Assembly its findings and recommendations concerning the regulation of septic tank waste. This report is made pursuant to Senate Resolution 961, adopted by the 1971 General Assembly, which directed the Commission to study "the need for legislation concerning the regulation of septic tank waste," and to report its findings and recommendations to the 1973 General Assembly.

This report was initiated by the Committee on Environmental Studies of the Legislative Research Commission to which the Commission assigned its study on the regulation of septic tank waste. The Committee on Environmental Studies consisted of:

Sen. William W. Staton, Co-Chm.	Sen. Lennox P. McLendon, Jr.
Rep. William R. Roberson, Jr., Co-Chm.	Sen. William D. Mills
Rep. P. C. Collins, Jr.	Sen. Marshall A. Rauch
Rep. Jack Gardner	Sen. Norris C. Reed, Jr.
Rep. W. S. Harris, Jr.	Rep. Carl M. Smith
Sen. Hamilton C. Horton, Jr.	Rep. Charles H. Taylor
Rep. W. Craig Lawing	Sen. Stewart B. Warren, Jr.

The Subcommittee to which this study was specifically referred consisted of Representative Charles Taylor, Chairman, Senator William Mills, Representative Carl Smith, and three public members--Mrs. Ruth Cook, Mr. Peter Feistman, and Dr. Charles Smallwood.

Respectfully,

Philip P. Godwin, Speaker

Senator Gordon Allen

Co-Chairmen, Legislative Research Commission

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Introduction

At the authorization and direction of the 1971 General Assembly (Senate Resolution 961) the Legislative Research Commission undertook this study of septic tank waste regulation. The Commission appointed a Committee on the Need for Environmental Legislation co-chaired by Senator William W. Staton and Representative William R. Roberson, Jr. This committee, in turn, appointed a subcommittee chaired by Representative Charles Taylor to consider separately the question of septic tank wastes and report its findings to the full committee.

The subcommittee included as legislative members, in addition to Representative Taylor, Senator William Mills and Representative Carl Smith. Public members included Mrs. Ruth Cook, Executive Secretary of the State Council for Social Legislation, Mr. Peter Feistman, a builder, and Dr. Charles Smallwood, a professor of environmental science.

The subcommittee held hearings and invited witnesses to discuss the problems and recommend possible solutions. It particularly sought input from persons working in the environmental field and from the State Board of Health, the state agency primarily concerned with regulation. It heard testimony from the Sanitary Engineering Division of the State Board of Health, the North Carolina Office of Comprehensive Health Planning, a county health department, homebuilders, consumers, regional planners, a septic tank manufacturer and septic tank cleaners and personnel having responsibility for supervision of package treatment plants. (A list of witnesses appears in the appendix.)

Based on the information gathered, we recommend that the Committee on the Need for Environmental Legislation appoint a subcommittee to

consider the need for an omnibus land use legislation package to report to the Legislative Research Commission prior to the opening of the 1973 General Assembly and that legislation be enacted to curb pollution resulting from septic tank wastes.

I.

Structure and Functioning of the Septic Tank System

An understanding of the structure and functioning of the septic tank system is necessary to a meaningful consideration of environmental and public health problems resulting from septic tank wastes and to a sensible approach to corrective legislation.

A septic tank system consists of two basic components: a container for holding and settling and a drainage system to transport and distribute effluent to the soil. The tank used in North Carolina is usually of precast concrete and ranges from 300 to 900 gallons holding capacity for residential uses. The function of the tank is to trap some of the solids in ordinary household waste and retain it to allow decomposition or fragmentation so that some of it can be carried through the drain system to the soil. In the normal case, less than 50% of received solids are retained within the tank. Very little of the solids volume which quickly begins to fill a tank is reduced through decomposition. Rather, reduction is accomplished through compacting and through flushing of solids into the soil. The drainage system is basically perforated pipe laid over a wide soil area so as to allow the effluent to percolate into the soil for absorption.

From the foregoing, it is clear that the most important part of the septic tank system really is the ground. Ordinary soil is the leaching agent, the waste treatment plant, if you will, of the septic tank system.

Thus the kind and quality of the soil is crucial to the proper operation of a septic tank system. For a septic tank system to be environmentally safe, the soil in the ground absorption field which receives its effluent must be of a kind which will purify wastewater. To purify wastewater, it must be porous enough to receive the water and possess particular leaching attributes. Problems associated with the tank and drainfield are discussed below.

Septic tank effluent reaching the soil usually contains chemicals and bacteria harmful to man should they be able to enter the ground water supply. The chemicals include phosphate, surfactants from synthetic detergents, chloride and nitrates. Significant bacteria include Salmonella typhoso and Vibriosa comma.

Evidence available to the subcommittee indicated that phosphate mobility through soil, particularly in areas of hard groundwater, is severely restricted so as to constitute little danger to the groundwater supply. It was indicated that certain synthetic detergents have great mobility through soil but that the biodegradable ones now coming into extensive use tend to break down rapidly in soil. Chlorides have greater mobility through soil but represent no threat to the public health unless they are released in extremely high concentrations. Nitrogen, rapidly converted to nitrates, also has high mobility and is a factor in methemoglobinemiae and thus requires large ground absorption fields for safety.

Turning to the bacterial agents, the evidence is somewhat conflicting but indicates that bacteria have a fair mobility through porous soil and a relatively long life in the soil, indicating a need for large fields and proper soil selection.

II.

Use Patterns and Practices in North Carolina

The septic tank first came to North Carolina, and to other states, as a rural sewage disposal device. Bringing urban convenience to the farmer it quickly achieved great popularity and gained extensive use throughout rural North Carolina. It soon became the fashion to install septic tanks wherever community sewage systems were not available. Since soil is the primary treatment agent in a septic tank system and since all soil is not suitable for the treatment of wastewater, problems developed early. However, state and county officials moved into the field and began prescribing guidelines and standards for septic tank use and installation. As long as our population was relatively sparse and relatively poor so that the real economic demand for septic tanks was small, the problems that arose, while serious, were handled without great difficulty in the majority of cases. When, however, changing economic conditions quickened the pace of land development and a more prosperous populace began to disdain the venerable privy, the built-in limitations of the septic tank system brought the incidence of unsolvable problems to an uncomfortably high level. Today, we find ourselves in a situation where a population still growing in size and affluence is demanding more housing as well as convenience in sewage disposal in a state where community sewer systems are found only in cities and a very few "urban counties." In response to this demand, developers are bringing into being new subdivisions, resorts and shopping centers with increasing rapidity. On another level, individual citizens, aided in some cases by federal programs, are erecting homes in areas not served by community sewer systems. Finally, the great popularity of the mobile home is stimulating the movement of

citizens, requiring sewage disposal, to areas not served by community systems. It is significant to note that this movement is stimulated also by the generally unfavorable attitude taken towards mobile homes by municipalities.

Thus the pattern which has developed is that a large number of subdivisions in North Carolina are serviced by septic tanks. The economics of development as well as the economics of consumer purchasing exert limiting pressures on the most important part of the system - soil. The same is true of enterprise developments such as shopping centers, although the need may be reduced somewhat here. Where individual consumer purchase of lots is concerned, this pressure is heightened as well as complicated by the poor condition of some of our present housing stock.

III.

Operational Problems and Environmental Effects

The Tank

Functioning primarily to retain solids for settling, the holding tank itself is not often a source of trouble. Over a period of time however, solids necessarily accumulate to such an extent that there is no longer sufficient space for settling and rapid clogging of the absorption field causes the system to fail. When this occurs removal of the sludge is necessary to prevent overloading of the field. Sometimes a tank becomes so filled with sludge that no more sewage can be received and back-up into plumbing fixtures occurs.

The subcommittee considered the need for structural modification of the tank to allow for easier sludge removal but concluded that the significant problems do not result from holding tank troubles.

Drainage System and Ground Absorption Field

The drainage system is basically a device for distributing effluent over a large ground area. It is composed of a pipe system with perforations or other openings to allow percolation of sewage into the soil. The efficiency of the system is increased by lengthening distribution lines, laying the pipe in the proper soil stratum and the use of gravel or other material to increase filtration capacity. Assuming that the drain system is properly laid, it, like the tank, poses no significant problems.

The testimony of installers and health officials alike make it abundantly clear that proper installation of the drainage system is very important to the operation of the system. The subcommittee therefore includes a proposal for greater training of operators in its recommendations.

Soil is the treatment mechanism in a septic tank system and the bulk of problems are caused by the absence of proper soil. If a drainage system is laid in improper soil there is no treatment of the effluent. In addition raw sewage, not being absorbed, rises to the ground posing a significant health problem.

The effectiveness of soil absorption is determined by (1) soil permeability, (2) groundwater level, (3) slope of ground and (4) depth of rock sand or gravel beneath the surface. Thus in areas of very tight soil, in regions with a high water table, where ground inclination is slight and where rock or sand lies near the surface, the use of the septic tank is difficult if not impossible. The subcommittee determined that the great bulk of problems in the whole septic tank field results from allowing septic tank installation in areas where the soil is not suited to it. Our recommendations include legislation designed to prevent

installation of tanks in areas where the soil has little reception or absorption capacity.

Any septic tank system will eventually fail. This is so because the soil, even the best soil, finally loses its absorptive ability or clogs so that effluent can no longer percolate into the ground. When this occurs the drainage system must be relaid in fresh soil. Soil may be physically clogged by sewage solids in the effluent, or chemically clogged through the swelling of soil particles resulting from sodium and potassium ion exchange, or biologically, in certain soil and under certain conditions, through plugging of soil pores by fecal organisms. Naturally, clogging is increased by concentration, as in subdivisions.

Conclusion

On the basis of the evidence presented the subcommittee reached these conclusions:

(1) - If properly sited, installed and maintained the septic tank system is an effective method of sewage disposal posing no significant threat to the environment or public health;

(2) - Tighter regulation is required to insure proper siting and installation;

(3) - Greater training is required for septic tank installers in order to achieve safe use;

(4) - The public needs to be informed as to the inability of septic tank systems to function in certain soil so as to prevent consumers from investing in unuseable lots;

(5) - The septic tank system will continue to be needed if the state is to be able to house its low income populace, make use of rural areas and avoid increased urban blight;

(6) - Though the concentration of septic tanks in a limited area quickens the pace of clogging, the septic tank, properly regulated, can continue to be useful and avoids the community sewer systems vice - release of great quantities of effluent into our waters;

(7) - Small community "package plant" type systems may be useful in replacing septic tanks in rural and suburban areas of high population density but local governments should be responsible for their maintenance and operation;

(8) - Septic tank misuse is but one aspect of land related environmental problems in this state and a land use police and plan is required for optimum environmental maintenance;

(9) - In subdivisions and in other areas too many septic tanks are sometimes installed in a small land area making adequate absorption of the effluent impossible.

Recommendations

(1) - The Committee on the Need for Environmental Legislation should appoint a committee to study comprehensive land regulation including (a) land sales registration, (b) the environmental impact of developments and (c) land use planning.

(2) - The General Assembly should enact a law requiring approval of lots in areas not served by community sewer systems for septic tank use and approval of the particular installation for issuance of an occupancy permit. All other permits and electrical service must follow the issuance of this permit.

(3) - The General Assembly should enact a law requiring training for septic tank installers before they are permitted to offer services.

(4) - The General Assembly should enact a law requiring mobile home dealers to give a copy of the occupancy permit law to prospective purchasers.

APPENDIX A
PROPOSED BILLS FOR IMPLEMENTATION
OF SUBCOMMITTEE RECOMMENDATIONS

A Bill to Be Entitled An Act to Protect The Public Health By Regulating
The Installation of Ground Absorption Sewage Disposal Systems

The General Assembly of North Carolina enacts:

Section 1. Chapter 130 of the General Statutes is hereby amended
by inserting therein a new article.

Section 2. This article shall be known and may be cited as the
"Ground Absorption Sewage Disposal System Act of 1973."

Section 3. Preamble: The General Assembly finds and declares that
continued installation, at a rapidly and constantly accelerating rate,
of septic tanks and other types of ground absorption sewage disposal
systems in a faulty or improper manner and in areas where unsuitable
soil and population density adversely affect the efficiency and func-
tioning of these systems has a detrimental effect on the public health
through contamination of the ground water supply. Recognizing, however,
that ground absorption sewage disposal can be rendered ecologically
safe and the public health protected if such methods of sewage disposal
are properly regulated and recognizing that ground absorption sewage
disposal will continue to be necessary for the adequate and economical
housing of an expanding population, the General Assembly intends hereby
to provide for the regulation of ground absorption sewage disposal systems
so that such systems may continue to be used, where appropriate, without
jeopardizing the public health.

Section 3. Definitions. As used herein, unless the context otherwise
requires:

(a) "construction" means any work done for the purpose of preparing
a dwelling or mobile home for initial occupancy;

(b) "location" means the initial placement of a mobile home;

(c) "relocation" means the displacement of a dwelling or mobile home from one site to another;

(d) "septic tank system" means a ground absorption sewage disposal system consisting of a holding or settling tank and a ground absorption field;

(e) "ground absorption sewage disposal system" means a sewage disposal method relying primarily on the soil for leaching and removal of dissolved and suspended organic or mineral materials from human waste;

(f) "health department" means any county, city, district, consolidated city-county or other health department authorized to be organized under Chapter 130 of the General Statutes;

(g) "mobile home dealer" means every person or firm offering mobile homes for sale within this state;

(h) "mobile home lot" means any place where two or more mobile homes are displayed and offered for sale.

Section 4. Improvements Permit Required

(a) No person shall commence the construction, or relocation of any dwelling nor shall any person locate, relocate or cause to be located or to be relocated any mobile home intended for use as a dwelling, other than a mobile home park, on a site in an area not served by a public or community sewage disposal system without first obtaining an improvements permit from the local health department having jurisdiction.

(b) The local health department shall issue an improvements permit authorizing work to proceed and the use of a septic tank or other ground absorption disposal system when it has determined that such a system can be installed at the site in compliance with the rules and regulations of

the local board of health governing such installations; provided, however, that no ground absorption disposal system which is attempted to be installed shall be covered with soil until the local health department determines that the system as installed is in compliance with the rules and regulations governing such installations.

Section 5. Certificate of Occupancy

Upon determining that the ground absorption system is properly installed, the local health department shall authorize it to be covered with soil and shall issue a certificate authorizing the dwelling or mobile home to be occupied. No dwelling or mobile home shall be occupied until a certificate of occupancy is issued.

Section 6. Certificate of Occupancy Required Before Other Permits To Issue

No permit required for electrical, plumbing, heating, air-conditioning or other initial construction, location, or relocation activity under any provision of general or special law shall be issued until after a certificate of occupancy has issued.

Section 7. Limitation on Electrical Service

It shall be unlawful for any person, partnership, firm or corporation to allow any electric current for use at the locating or relocating of a mobile home intended to be used as a dwelling, other than one in a mobile home park, or to allow any electric current except that furnished through a temporary service pole to a dwelling upon construction or relocation, unless the owner or builder has in his possession a valid certificate of occupancy for that site.

Section 8. Appeals

Any owner or builder denied an improvements permit or a certificate

of occupancy under this article shall have a right of appeal to the local board of health, provided such action is taken within fifteen days of denial. Notice of appeal shall be given by filing with the local health director a demand for a hearing. Upon filing of such notice the local health director shall, within three days transmit to the board of health all papers and materials constituting the record upon which the decision appealed from was made.

The local board of health shall hold a hearing with fifteen days of its receipt of the notice of appeal. The board shall give the appellant not less than five days notice of the date, time and place of the hearing. Any party may appear in person or by agent or attorney. In considering appeals, the board shall have authority only to determine whether a ground absorption system can be installed in compliance with its rules or regulations or whether the work done so complies.

No person denied an improvements permit or certificate of occupancy shall proceed with any work or improvement activity whatsoever or shall occupy any dwelling or reside in any mobile home unless and until the board issues the necessary permit.

Section 9. Judicial Review

Any owner or builder denied a permit under this article shall have a right of appeal to the superior court having jurisdiction, if such appeal be made within 10 days after the date of the denial by the board.

Section 10. Training for Septic Tank Installation and Certificate of Attendance

(a) Local health departments are authorized and directed to offer a training course for all persons installing septic tanks for a fee in North Carolina. From and after two years from the effective date of this

article, no person shall install septic tank systems nor hold himself out as a septic tank contractor or cleaner unless he holds a certificate of attendance at one such course.

(b) The content of the course shall be prescribed by the State Board of Health and shall include instruction in the functioning and operation of all components of septic tank systems, familiarization with basic soil characteristics of the major geographic regions and sub-regions of the state, identification of recurrent problems in septic tank installation and use as well as instruction relating to laws pertaining to septic tank installation. No training course shall be more than sixteen hours in length and a certificate of attendance shall be issued to every person present for the required number of hours. Every ~~person~~ desiring to attend a school shall be admitted.

(c) Local health departments may offer the training course cooperatively with other local health departments, through contracting with other health departments, technical institutes or other competent agencies to offer the course or by other means; provided however, every local health department shall insure that all applicants from its jurisdiction have an opportunity to attend a course within three months of application.

(d) Applicants are entitled to admission to a training course in any county upon proper registration.

Section 11. Duties of Mobilehome Dealers

(a) Every mobile home dealer doing business in this state shall be required to furnish each purchaser of a mobile home a copy of this article.

The State Board of Health is authorized and directed to furnish each mobile home dealer sufficient copies of this article.

(b) Each mobile home dealer shall be required to post conspicuously at the office of each mobile home lot the following:

NOTICE: State law requires that the local health department determine the suitability of private lots for septic tank installation before a mobile home is placed on the premises.

Section 12. Exemptions

No provision of this section shall apply to persons developing land in areas not served by community sewer systems who present acceptable plans for installation of community sewer systems to the local health department and the State Board of Air and Water Resources and who certify that such system will be installed before permitting occupancy.

Section 13. Penalties

Any person who knowingly violates any provision of this act shall be guilty of a misdemeanor and shall be punishable by a fine not to exceed \$200.00.

Section 14. Severability

If any provision of this act or the application thereof to any person or circumstances is declared invalid, such invalidity shall not affect other provisions or applications of the act which can be given effect without the invalid provisions or applications, and to this end the provisions of this act are declared to be severable.

of nutrient pollution are apparent, the time for action has come. Where understanding is deficient or symptoms are not plain, more study and surveillance are in order.

The evidence that we have received of the need for detergent nutrient controls at the state or local levels is not sufficient to clearly outweigh contrary indications at this time. Thus, we are not prepared to recommend that the BWAR be authorized to impose limitations on phosphatic or other nutrient content of detergents. However, we would not wish to deter the BWAR from continuing its own examination of this subject, nor from making such recommendations as its findings may suggest.

Appendix B

List of Subcommittee Members

Representative Charles Taylor, Chairman

Mrs. Ruth Cook, Raleigh

Mr. Peter Feistman, Asheville

Senator William Mills

Dr. Charles Smallwood, Raleigh

Representative Carl Smith

Staff services.....Ernest E. Ratliff
Institute of Government

List of Witnesses

Marshall Staton, Director, Sanitary Engineering Division, North Carolina State Board of Health

Stacy Covil, Assistant Director, Sanitary Engineering Division, North Carolina State Board of Health

Ray Paul, Division of State Planning

Dr. Millard Bethel, Health Director, Wake County

Mitchell Duke, R.S., Sanitarian, Wake County Board of Health

William Smith, Soil Scientist, Consultant to Wake County Board of Health

Douglas Franks, Septic Tank Contractor, Raleigh

Woody Wilson, Septic Tank Contractor, Raleigh

Ed Kilpatrick, Sanitary Engineering Division, North Carolina State Board of Health

Jack Delaney, North Carolina Homebuilders Association, Charlotte

Fred Herndon, North Carolina Homebuilders Association, Charlotte

Mrs. E. J. Crittenden, Feltonville Water Association, Apex, North Carolina

John Scott, Research Triangle Planning Commission

Ms. Joan Beal, Research Triangle Planning Commission

Thomas Bruce, Assistant Director, Water Resources Department, Durham, North Carolina

Arnold Grigsby, Water Resources Department, Durham, North Carolina

